

Timothy J. Stasevich

LRBGE, NCI-NIH, 41 Library Drive, Bethesda, MD 20892 | (301) 496-7562 | stasevicht@mail.nih.gov

EDUCATION

Ph.D. Physics, U. Maryland, College Park

August 2006

Dissertation: *Orientation Dependence of Surface Step Stiffness*

Advisor: Prof. Theodore L. Einstein

M.S. Physics, U. Maryland, College Park

August 2001

Scholarly Paper: *Computing Transfer Maps from Magnetic Boundary Field Data*

Advisor: Prof. Alex J. Dragt

B.S. High Distinction, Physics & Mathematics, U. Michigan, Dearborn

June 1999

RESEARCH INTERESTS

- FRAP, transcription factor binding to DNA, gene regulation
- Thermodynamics, equilibrium and non-equilibrium statistical mechanics
- Surface physics, step edge fluctuations and energetics, diffusion
- Density functional theory and Monte Carlo simulations

MEMBERSHIPS AND HONORS

- 1999-2001 UMCP Department of Physics Fellow
- 1999 UM-Dearborn Math Honors Scholar
- 1998 UM-Dearborn Physics Honors Scholar
- 1998 UM-Dearborn Carl H. Rasmussen Math Award Recipient
- American Physical Society

RESEARCH EXPERIENCE

Post-doctoral Research at LRBGE, NCI- NIH

October 2006 – Present

Ongoing research with Dr. James McNally using FRAP (Fluorescence Recovery After Photobleaching) to quantify protein binding to DNA.

- Developed a generalized FRAP protocol that utilizes spatial data conventionally averaged out, improving overall fits to data.
- Used FRAP to quantify cooperative binding dynamics of H1⁰ to chromatin.

Doctoral Research at UMCP

September 2002 – August 2006

Ph.D. work with Prof. Theodore L. Einstein characterizing the dynamics and energetics of steps on vicinal surfaces.

- Quantified effects of C₆₀ molecules on the shapes of Ag(111) adatom islands.

- Computed using VASP code ab-initio lattice-gas energies for Cu on Cu(001) and Cu(111).
- Statistically analyzed LEEM step fluctuation data to extract step line-tension.
- Conceived and developed a Monte-Carlo simulation of partially confined steps bordering a facet edge that matches experimental and theoretical expectations.
- Derived useful formulas for the low-temperature step stiffness on {001} and {111} surfaces.

University of Maryland, College Park

March 2000 – August 2001

M.S. work with Prof. Alex J. Dragt applying Lie algebra to accelerator physics.

- Wrote and tested a C-program (for *MARYLIE*) to find transfer maps from boundary field data.
- Edited and illustrated a draft of Prof. Dragt's book *Lie Methods for Nonlinear Dynamics with Applications to Accelerator Physics*.

University of Michigan, Dearborn

March 1997 – June 1999

Statistical mechanics research with Prof. Jeffrey J. Prentis.

- Utilized microscopic models for heat reservoirs to determine their impact on the limits required to derive the Boltzmann factor.

University of Michigan, Ann Arbor

January 1999 – June 1999

Constructed an electronic control box for a beam-based PALS (Positron Annihilation Lifetime Spectroscopy) experiment with Prof. David Gidley.

State University of New York, Stony Brook

June 1998 – August 1998

REU research with Prof. Gene Sprouse on the optical pumping of ^{211}Rn .

- Designed, built, and analyzed experimental data to measure the magnetic moment of Rn.

University of California, San Diego

June 1997 – August 1997

REU research with Prof. Brian Maple on non-Fermi liquid (NFL) materials.

- Fabricated and tested the transport properties of NFL alloys.

PUBLICATIONS

- [1] *Crossover from the Exact Factor to the Boltzmann Factor*, J. J. Prentis, A. E. Andrus and **T. J. Stasevich**, Am. J. Phys. **67**, 508 (1999).
- [2] *Effects of Next-Nearest-Neighbors on the Orientation Dependence of Step Stiffness: Reconciling Theory with Experiment for Cu(001)*, **T. J. Stasevich**, T. L. Einstein, R. K. P. Zia, M. Giesen, H. Ibach, and F. Szalma, Phys. Rev. B **70**, 245404 (2004).
- [3] *Low-Temperature Orientation Dependence of Step Stiffness on {111} Surfaces*, **T. J. Stasevich**, H. Gebremariam, and T. L. Einstein, Phys. Rev. B **71**, 245414 (2005).
- [4] *Extended Lattice Gas Interactions of Cu on Cu(001) and Cu(111): Ab-initio Evaluation and Implications*, **T. J. Stasevich**, T. L. Einstein, and S. Stolbov, Phys. Rev. B **73**, 115426 (2006).
- [5] *Step Fluctuations on Ag(111) Surfaces with C_{60}* , C. Tao, **T. J. Stasevich**, T. L. Einstein, and E. D. Williams, Phys. Rev. B **73**, 125436 (2006).

- [6] *Distinctive Fluctuations in a Confined Geometry*, M. Degawa, **T. J. Stasevich**, W. G. Cullen, Alberto Pimpinelli, T. L. Einstein, and E. D. Williams, Phys. Rev. Lett. **97**, 080601 (2006).
- [7] *Modeling the Anisotropy of Step Fluctuations on Surfaces: Theoretical Step Stiffness Confronts Experiment*, **T. J. Stasevich**, Ph.D. Thesis, Dept. of Physics, University of Maryland, College Park.
- [8] *Analytic Formulas for the Full Orientation Dependence of Step Stiffness and Line Tension*, **T. J. Stasevich** and T. L. Einstein, Multiscale Modeling and Simulation **6**, 90 (2007).
- [9] *Metal/Molecule Interface Fluctuations*, C. Tao, **T. J. Stasevich**, W. G. Cullen, T. L. Einstein, and E. D. Williams, Nano Lett. **7**, 1495 (2007). [Highlighted in Nature **446**, 472 (2007)]
- [10] *Facet-edge Fluctuations with Periphery Diffusion Kinetics*, M. Degawa, **T. J. Stasevich**, A. Pimpinelli, T. L. Einstein, E. D. Williams, Surf. Sci. **601**, 3979 (2007).
- [11] *Sensitivity of Short-Range Trio Interactions to Lateral Relaxation of Adatoms: Challenges for Detailed Lattice-Gas Modeling*, Rajesh Sathiyarayanan, **T. J. Stasevich**, and, T. L. Einstein, Surf. Sci. (2008), doi: 10.1016/j.susc.2008.01.022
- [12] *Concurrent Fast and Slow Cycling of a Transcriptional Activator at an Endogenous Promoter*, T. S. Karpova, M. J. Kim, C. Spriet, K. Nalley, **T. J. Stasevich**, Z. Kherrouche, L. Heliot, and J. G. McNally, Science **25**, 466 (2008).
- [13] *Temperature Dependence of Si(111) Absolute Line Tension*, M. Man, **T. J. Stasevich**, F. Szalma, T. L. Einstein, and M. Altman, Phys. Rev. B (in press).
- [14] *Impurity Decoration for Crystal Shape Control: C_{60} on Ag(111)*, **T. J. Stasevich**, C. Tao, W. G. Cullen, T. L. Einstein, and E. D. Williams, preprint.

RECENT PRESENTATIONS

- [1] *In-vivo Evidence for $H1^0$ Binding to Chromatin Via a Sequence of Metastable Intermediate States*—Talk given at the 2008 NIH Center of Excellence in Chromatin Biology Meeting.
- [2] *Deconstructing $H1^0$ Binding: Another Dimension to FRAP*—Talk given at the November 20th, 2008 NIH Chromatin Group Meeting.
- [3] *Low-Temperature Orientation Dependence of Surface Step Stiffness*—Invited talk in October 2005 given at UCLA's Institute of Pure and Applied Mathematics (IPAM).

SKILLS:

- Confocal microscopy, FRAP, reaction-diffusion models
- Extensive coursework background in statistical mechanics and thermodynamics.
- Experience with numerical simulations and models, including Monte Carlo simulations and density functional theory (VASP and WIEN2k).
- Proficient in Mathematica, C, C++, UNIX, and Latex.
- Teaching Assistant for UMCP solid state physics 731 and 732.

- Active outreach participant, including science mentoring for young students and presentation of science shows at the DC Spy Museum and Sligo Creek Elementary School.

REFERENCES:

- James McNally (postdoc advisor) (301) 402-0209
Director, Fluorescence Imaging Facility, LRBGE NCI-NIH mcnallyj@exchange.nih.gov
- Theodore L. Einstein (Ph.D. Advisor) (301) 405-6147
Professor of Physics, UMCP einstein@umd.edu
- Ellen D. Williams (301) 405-6156
Professor of Physics, UMCP edw@umd.edu
- Jeffrey J. Prentis (Undergrad. Advisor) (313) 436-9113
Physics Dept. Chair, UM-Dearborn jprentis@umd.umich.edu
- Royce Zia (540) 231-5767
Physics Dept. Chair, Virginia-Tech rkpzia@vt.edu
- Dionisius Margetis (617) 253-6544
Assistant Professor, UMCP dio@math.umd.edu